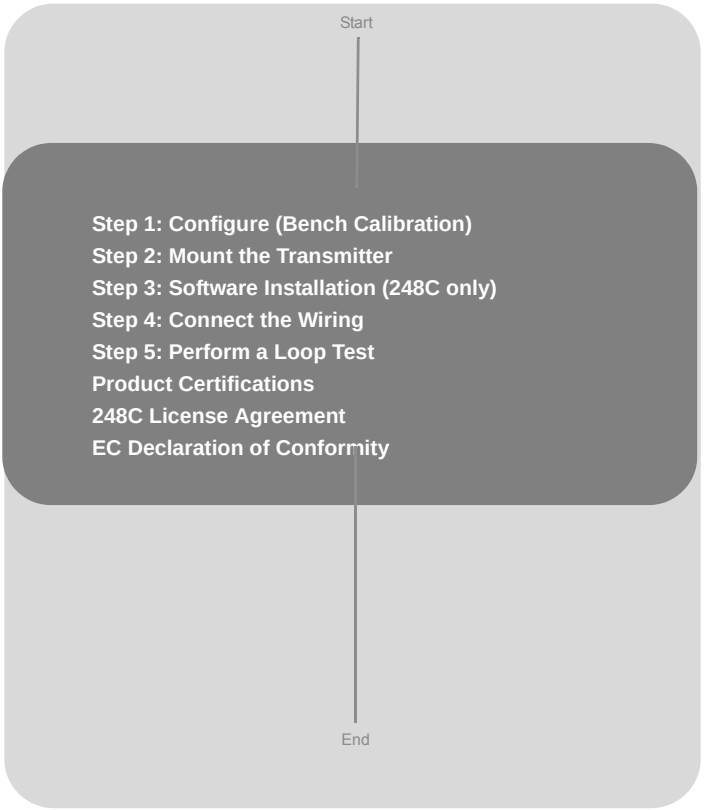
Quick Installation Guide
00825-0100-4825, Rev DB
February 2011

Rosemount 248

Rosemount 248 Temperature Transmitter



HART COMMUNICATION PROTOCOL

ROSEMOUNT

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EMERSON Process Management

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⚠ IMPORTANT NOTICE

This installation guide provides basic guidelines for the Rosemount® 248. It does not provide instructions for detailed configuration, diagnostics, maintenance, service, troubleshooting, or installations. Refer to the Rosemount 248 reference manual (document number 00809-0100-4825) for more instruction. The manual and this QIG are also available electronically on www.rosemount.com.

⚠ WARNING

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Hazardous Locations Certifications for any restrictions associated with a safe installation. In an Explosion-proof/Flame-proof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death

- Install and tighten thermowells or sensors before applying pressure.
- Do not remove the thermowell while in operation.

Electrical shock can result in death or serious injury

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

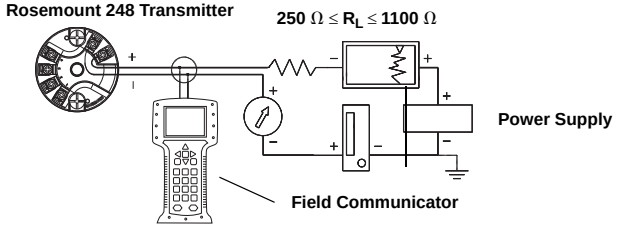
STEP 1: CONFIGURE (BENCH CALIBRATION)

The Rosemount 248 communicates using the 375 Field Communicator (communication requires a loop resistance between 250 and 1100 ohms. Do not operate when power is below 12Vdc at the transmitter terminal). Refer to the Rosemount 248 Reference Manual (document number 00809-0100-4825) and the 375 Field Communicator Reference Manual (http://www.fieldcommunicator.com/suppmanu.htm) for more information.

Connecting a Field Communicator

The Hand-held Communicator Field Device Revision Dev v1, DD v1 is required for complete functionality.

Figure 1. Connecting a Communicator to a Bench Loop



Verify Transmitter Configuration

To verify operation using a Field Communicator, refer to the Fast Keys below. Refer to the Rosemount 248 Reference Manual (document number 00809-0100-4825) for more detailed description.

Function	Fast Keys	Function	Fast Key
Active Calibrator	1, 2, 2, 1, 3	Poll Address	1, 3, 3, 3, 1
Alarm/Saturation	1, 3, 3, 2	Process Temperature	1, 1
AO Alarm Type	1, 3, 3, 2, 1	Process Variables	1, 1
Burst Mode	1, 3, 3, 3, 3	PV Damping	1, 3, 3, 1, 3
Burst Option	1, 3, 3, 3, 4	PV Unit	1, 3, 3, 1, 4
Calibration	1, 2, 2	Range Values	1, 3, 3, 1
Configuration	1, 3	Review	1, 4
D/A Trim	1, 2, 2, 2	Scaled D/A Trim	1, 2, 2, 3
Damping Values	1, 1, 10	Sensor Connection	1, 3, 2, 1, 1

Function	Fast Keys	Function	Fast Key
Date	1, 3, 4, 2	Sensor 1 Setup	1, 3, 2, 1, 2
Descriptor	1, 3, 4, 3	Sensor Serial Number	1, 3, 2, 1, 3
Device Info	1, 3, 4	Sensor 1 Trim	1, 2, 2, 1
Device Output Configuration	1, 3, 3	Sensor 1 Trim-Factory	1, 2, 2, 1, 2
Diagnostics and Service	1, 2	Sensor Type	1, 3, 2, 1, 1
Filter 50/60 Hz	1, 3, 5, 1	Software Revision	1, 4, 1
Hardware Rev	1, 4, 1	Status	1, 2, 1, 4
Hart Output	1, 3, 3, 3	Tag	1, 3, 4, 1
Intermittent Detect	1, 3, 5, 4	Terminal Temperature	1, 3, 2, 2,
Loop Test	1, 2, 1, 1	Test Device	1, 2, 1
LRV (Lower Range Value)	1, 1, 6	URV (Upper Range Value)	1, 1, 7
LSL (Lower Sensor Limit)	1, 1, 8	USL (Upper Sensor Limit)	1, 1, 9
Measurement Filtering	1, 3, 5	Variable Mapping	1, 3, 1
Message	1, 3, 4, 4	Variable Re-Map	1, 3, 1, 3
Num Req Preams	1, 3, 3, 3, 2	Write Protect	1, 2, 3
Open Sensor Holdoff	1, 3, 5, 3	2-Wire Offset	1, 3, 2, 1, 2, 1
Percent Range	1, 1, 5		

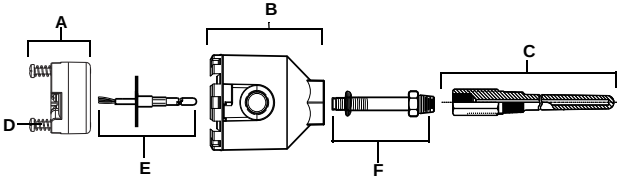
STEP 2: MOUNT THE TRANSMITTER

Mount the transmitter at a high point in the conduit run to prevent moisture from draining into the transmitter housing.

Typical European and Asia Pacific Installation

Head Mount Transmitter with DIN Plate Style Sensor

1. Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying process pressure.
2. Assemble the transmitter to the sensor. Push the transmitter mounting screws through the sensor mounting plate and insert the snap rings (optional) into the transmitter mounting screw groove.
3. Wire the sensor to the transmitter.
4. Insert the transmitter-sensor assembly into the connection head. Thread the transmitter mounting screw into the connection head mounting holes. Assemble the extension to the connection head. Insert the assembly into the thermowell.
5. Slip the shielded cable though the cable gland
6. Attach a cable gland into the shielded cable.
7. Insert the shielded cable leads into the connection head through the cable entry. Connect and tighten the cable gland.
8. Connect the shielded power cable leads to the transmitter power terminals. Avoid contact with sensor leads and sensor connections.
9. Install and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.



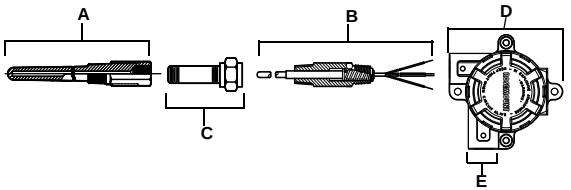
A = Rosemount 248 Transmitter	D = Transmitter Mounting Screws
B = Connection Head	E = Integral Mount Sensor with Flying Leads
C = Thermowell	F = Extension

STEP 2 CONTINUED...

Typical North and South American Installation

Head Mount Transmitter with Threaded Sensor

1. Attach the thermowell to the pipe or process container wall. Install and tighten thermowells before applying process pressure.
2. Attach necessary extension nipples and adapters to the thermowell. Seal the nipple and adapter threads with silicone tape.
3. Screw the sensor into the thermowell. Install drain seals if required for severe environments or to satisfy code requirements.
4. Pull the sensor wiring leads through the universal head and transmitter. Mount the transmitter in the universal head by threading the transmitter mounting screws into the universal head mounting holes.
5. Mount the transmitter-sensor assembly into the thermowell. Seal adapter threads with silicone tape.
6. Install conduit for field wiring to the conduit entry of the universal head. Seal conduit threads with silicone tape.
7. Pull the field wiring leads through the conduit into the universal head. Attach the sensor and power leads to the transmitter. Avoid contact with other terminals.
8. Install and tighten the universal head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.

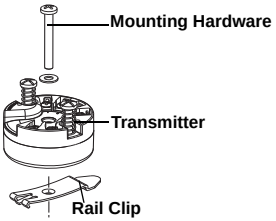


A = Threaded Thermowell
B = Threaded Style Sensor
C = Standard Extension
D = Universal Head
E = Conduit Entry

STEP 2 CONTINUED...

Mounting to a DIN Rail

To attach the Rosemount 248H to a DIN rail, assemble the appropriate rail mounting kit (part number 00248-1601-0001) to the transmitter as shown.



Rail Mount Transmitter with Remote Mount Sensor

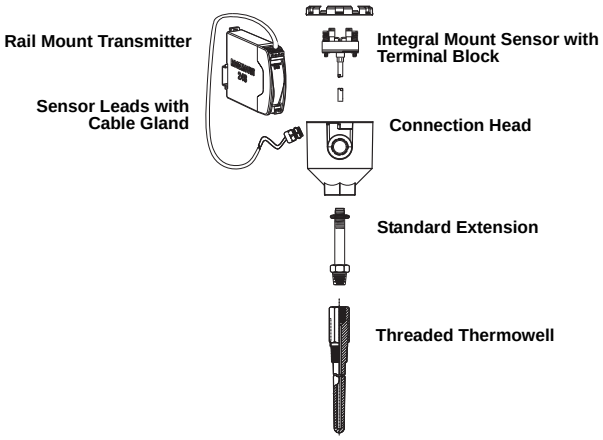
The least complicated assembly uses:

- a remote mounted transmitter
- an integral mount sensor with terminal block
- an integral style connection head
- a standard extension
- a threaded thermowell

Refer to the Metric Product Data Sheet (document number 00813-0101-2654) for complete sensor and mounting accessory information.

To complete the assembly, follow the procedure described below.

1. Attach the transmitter to a suitable rail or panel.
2. attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying pressure.
3. Attach the sensor to the connection head and mount the entire assembly to the thermowell.
4. Attach sufficient lengths of sensor lead wire to the sensor terminal block.
5. Attach and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.
6. Run sensor lead wires from the sensor assembly to the transmitter.
7. Attach the sensor and power leads to the transmitter. Avoid contact with leads and terminals.



Rail Mount Transmitter with Threaded Sensor

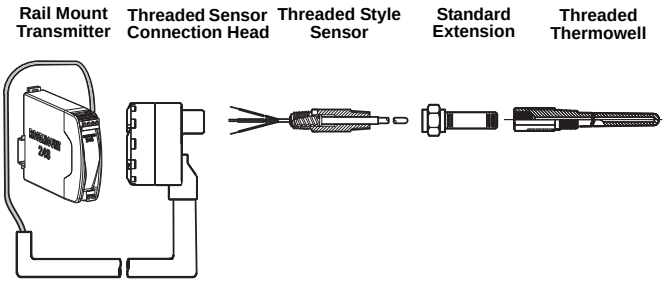
The least complicated assembly uses:

- a threaded sensor with flying heads
- a threaded sensor connection head
- a union and nipple extension assembly
- a threaded thermowell

Refer to Volume 1 of the Rosemount Sensors Product Data Sheet (document number 00813-0100-2654) for complete sensor and mounting accessory information.

To complete the assembly, follow the procedure described below.

1. Attach the transmitter to a suitable rail or panel.
2. Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying pressure.
3. Attach necessary extension nipples and adaptors. Seal the nipple and adapter threads with silicone tape.
4. Screw the sensor into the thermowell. Install drain seals if required for severe environments or to satisfy code requirements.
5. Screw the connection head to the sensor.
6. Attach the sensor lead wires to the connection head terminals.
7. Attach additional sensor lead wires from the connection head to the transmitter.
8. Attach and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.
9. Attach the sensor and power leads to the transmitter. Avoid contact with leads and terminals.



STEP 3: SOFTWARE INSTALLATION (248C ONLY)

1. Install the 248C software
   - Place the 248C CD-ROM in the drive
   - Run setup.exe from Windows NT, 2000, or XP
2. HART interface Box (248C1 option): Connect the HART Interface Box to PC and 248 transmitter per instructions located on the HART Interface Box label
3. Install Serial HART modem (248C2 option) or USB HART modem (248C3 option). Please see instructions accompanying modem hardware.
4. For USB modem (248C3 option): Upon first use, configure appropriate COM ports within 248C software by selecting “Port Settings” from the “Communicate” menu. The USB modem driver emulates a COM port and will add to available port selections in the software’s drop-down box. Otherwise software defaults to first available COM port, which may not be correct.

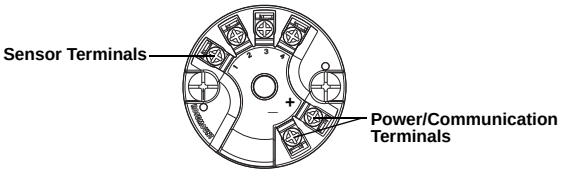
STEP 4: CONNECT THE WIRING

- Wiring diagrams are located on the top label of the transmitter.
- An external power supply is required to operate the transmitter.
- The power required across the transmitter power terminals is 12 to 42.4 V dc (the power terminals are rated to 42.4 V dc). To prevent damaging the transmitter, do not allow terminal voltage to drop below 12.0 V dc when changing the configuration parameters.

Power the Transmitter

1. Connect the positive power lead to the “+” terminal. Connect the negative power lead to the “–” terminal.
2. Tighten the terminal screws.
3. Apply power (12 – 42 V dc).

Figure 2. Power, Communication, and Sensor Terminals



STEP 4 CONTINUED...

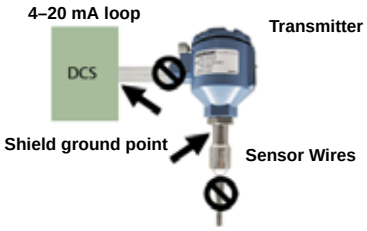
Ground the Transmitter

Ungrounded Thermocouple, mV, and RTD/Ohm Inputs

Each process installation has different requirements for grounding. Use the grounding options recommended by the facility for the specific sensor type, or begin with grounding Option 1 (the most common).

Option 1 (for grounded housing):

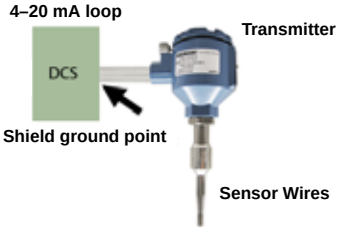
1. Connect sensor wiring shield to the transmitter housing.
2. Ensure the sensor shield is electrically isolated from surrounding fixtures that may be grounded.
3. Ground signal wiring shield at the power supply end.



Option 2 (for ungrounded housing):

1. Connect signal wiring shield to the sensor wiring shield.
2. Ensure the two shields are tied together and electrically isolated from the transmitter housing.
3. Ground shield at the power supply end only.

Ensure that the sensor shield is electrically isolated from the surrounding grounded fixtures.

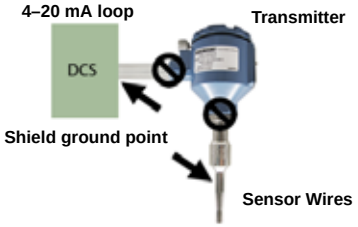


Connect shields together, electrically isolated from the transmitter

STEP 4 CONTINUED...

Option 3 (for grounded or ungrounded housing):

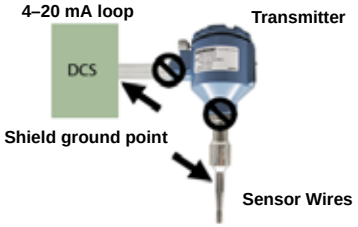
1. Ground sensor wiring shield at the sensor, if possible.
2. Insure that the sensor wiring and signal wiring shields are electrically isolated from the transmitter housing.
3. Do not connect the signal wiring shield to the sensor wiring shield.
4. Ground signal wiring shield at the power supply end.



Grounded Thermocouple Inputs

Option 4

1. Ground sensor wiring shield at the sensor.
2. Ensure that the sensor wiring and signal wiring shields are electrically isolated from the transmitter housing.
3. Do not connect the signal wiring shield to the sensor wiring shield.
4. Ground signal wiring shield at the power supply end.



STEP 5: PERFORM A LOOP TEST

The Loop Test command verifies transmitter output, loop integrity, and operation of any recorders or similar devices installed in the loop.

NOTE:
This is not available with the 248C Configuration Interface.

Initiate a loop test:

1. Connect an external ampere meter in series with the transmitter loop (so the power to the transmitter goes through the meter at some point in the loop.
2. From the home screen select 1) *Device Setup*, 2) *Diag/Serv*, 1) *Test Device*, 1) *Loop Test*.
3. Select a discrete milliampere level for the transmitter to output. At **Choose Analog Output** select 1) *4mA*, 2) *20mA* or select 3) *Other* to manually input a value between 4 and 20 milliamperes. Select **Enter** to show the fixed output. Select **OK**.
4. In the test loop, check that the fixed mA input and the transmitter's mA output are the same value. If the readings do not match, either the transmitter requires an output trim or the current meter is malfunctioning.

After completing the test, the display returns to the loop test screen and allows the user to choose another output value. To end the Loop Test, Select 5) *End* and **Enter**.

PRODUCT CERTIFICATIONS

Approved Manufacturing Locations

Rosemount Inc. – Chanhassen, Minnesota, USA
Rosemount Temperature GmbH – Germany
Emerson Process Management Asia Pacific – Singapore

European Union Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting our local sales representative.

ATEX Directive (94/9/EC)

Rosemount Inc. complies with the ATEX Directive.

Electro Magnetic Compatibility (EMC) (89/336/EEC)

All Models: EN 50081-1: 1992; EN 50082-2:1995; EN 61326-1:1997 – Industrial

NAMUR NE21 Recommendations

The Rosemount 248 meets the requirements for NAMUR NE21 Rating

Susceptibility	Parameter	Influence
ESD	• 6 kV contact discharge • 8 kV air discharge	None
Radiated	• 80 – 1000 MHz at 10 V/m AM	None
Burst	• 1 kV for I.O.	None
Surge	• 0.5 kV line–line • 1 kV line–ground (I.O. tool)	None
Conducted	• 150 kHz to 80 MHz at 10 V	None

CE Mark

The Rosemount 248 meets all requirements listed under IEC 61326:Amendment 1, 1998

Hazardous Locations Certifications(1)

North American Certifications

Factory Mutual (FM)

I5 FM Intrinsic Safety and Non-incendive
Intrinsically Safe for Class I/II/III, Division 1, Groups A, B, C, D, E, F, and G. Non-incendive Field Circuit for Class I, Division 2, Groups A, B, C, and D. Intrinsically Safe and non-incendive when installed in accordance with Rosemount drawing 00248-1055.

Temperature Codes:
T5 (T_{amb} = –50 to 75 °C)
T6 (T_{amb} = –50 to 40 °C)

Table 1. Entity Parameters

Loop/Power	Sensor
U_i = 30 Vdc	U_o = 45 Vdc
I_i = 130 mA	I_o = 26 mA
P_i = 1.0 W	P_o = 290 mW
C_i = 3.6 nF	C_o = 0.4 nF
L_i = 13.8 µH	L_o = 49.2 mH

E5 FM Explosion-Proof
Explosion-Proof for Class I, Division 1, Groups B, C, and D. Dust Ignition Proof for Class II/III, Division 1, Groups E, F, G when installed in accordance with Rosemount drawing 00644-1049.
Temperature Codes:
T5 (T_{amb} = –40 to 85 °C)

Combination Certifications

K5 Combination of I5 and E5.

Canadian Standards Association (CSA) Approvals

I6 CSA Intrinsically Safe and Class I, Division 2
Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D when installed in accordance with Rosemount drawing 00248-1056.

Temperature Codes:
T5 (T_{amb} = –50 to 60 °C)
T6 (T_{amb} = –50 to 40 °C)

Suitable for use in Class I, Division 2, Groups A, B, C, and D.

K6 CSA Intrinsically Safe, Explosion-Proof, and Class I, Division 2.
Combination of I6 and Explosion-Proof for Class I, Division 1, Groups B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1 hazardous locations, when installed in accordance with Rosemount drawing 00644-1059.
Suitable for Class I, Division 2, Groups A,B, C, and D.
Ambient Temperature Limit: –50 to 85°C

(1) Consult factory for availability.

European Certifications

CENELEC Approvals

I1 CENELEC Intrinsic Safety
Certificate Number: Baseefa03ATEX0030X
ATEX Marking: ⟨Ex⟩ II 1 G
CE 1180
Ex ia IIC

Temperature Codes:
T5 (–60 ≤ T_{amb} ≤ 80 °C)
T6 (–60 ≤ T_{amb} ≤ 60 °C)

Table 2. Entity Parameters

Loop/Power	Sensor
U_i = 30 Vdc	U_o = 45 Vdc
I_i = 130 mA	I_o = 26 mA
P_i = 1.0 W	P_o = 290 mW
C_i = 3.6 nF	C_i = 2.1 nF
L_i = 0	L_i = 0

Special Conditions for Safe Use (X):
The apparatus must be installed in an enclosure which affords it a degree of protection of at least IP20. Non-metallic enclosures must have a surface resistance of less than 1 GOHM; light alloy or zirconium enclosures must be protected from impact and friction when installed.

E1 CENELEC Flame-Proof Approval
Certificate Number: KEMA99ATEX8715X
ATEX Marking: ⟨Ex⟩ II 2 G
CE 1180
Ex d IIC

Table 3. Entity Parameters

U_{max} = 42.4 Vdc
U_{max} = 24 mA

Temperature Codes:
T6 (–50 ≤ T_{amb} ≤ 65 °C)

Special Conditions for Safe Use (X):

For information on the dimensions of the flameproof joints, the manufacturer shall be contacted.

N1 CENELEC Type n
Certificate Number: BAS00ATEX3145
ATEX Marking: ⟨Ex⟩ II 3G
Ex nL IIC

Table 4. CENELEC Input Parameters

U_{max} = 45 V

Temperature Codes:
T5 (–40 ≤ T_{amb} ≤ 70 °C)

NC CENELEC Type n Component
Certificate Number: Baseefa03ATEX0032U
ATEX Marking: ⟨Ex⟩ II 3G
Ex nA IIC

Table 5. CENELEC Input Parameters

U_i = 42.4 V
C_i = 3.6nF
L_i = 0

Temperature Codes:
T5 (–60 ≤ T_{amb} ≤ 80°C)
T6 (–60 ≤ T_{amb} ≤ 60°C)

IECEx Certifications

I7 IECEx Intrinsic Safety
Certificate Number: IECEx BAS 07.0086X
Ex ia IIC T5 (-60°C ≤ Ta ≤ +80°C)
Ex ia IIC T6 (-60°C ≤ Ta ≤ +60°C)

Special Conditions for Safe Use (X):

The apparatus must be installed in an enclosure which affords it a degree of protection of at least IP20. Non-metallic enclosures must have a surface resistance of less than 1GΩ; light alloy or zirconium enclosures must be protected from impact and friction when installed.

Table 6. Entity Parameters

Loop / Power	Sensor
U_i = 30 Vdc	U_o = 45 Vdc
I_i = 130 mA	I_o = 26 mA
P_i = 1.0 W	P_o = 290 mW
C_i = 3.63 nF	C_i = 2.1 nF
L_i = 0 mH	L_i = 0

E7 IECEx Flameproof and Dust
Certificate No.: IECEx KEM 09.0015X
Ex d IIC T6 (Flameproof)
Ex tD A20 IP 66 T 95 ºC (Dust)
Vmax = 42.4V

Special Conditions for Safe Use (X):

For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

Table 7. Electrical Data

Transmitter	Sensor
U_{max} = 42.4 Vdc	U_{max} = 5 V
I_{max} = 24.0 mA	I_{max} = 2.0 mA

N7 IECEx Type n
Certificate Number: IECEx BAS 07.0055
Ex nA nL IIC T5 (-40 °C < Ta < 70 °C)

Table 8. Electrical Data

	Sensor	
Transmitter	**RTD**	**Thermocouple**
Ui = 42.4 V	Ui = 5 V	Ui = 0

NG IECEx Type n Component
Certificate Number: IECEx BAS 08.0087U
Ex nA IIC T5 (-60°C ≤ Ta ≤ +80°C)
Ex nA IIC T6 (-60°C ≤ Ta ≤ +60°C)
Input Parameter: Ui = 42.4 Vdc

Schedule of Limitations:
The component must be housed in a suitably certified enclosure that provides a degree of protection of at least IP54.

Brazilian Certifications

Centro de Pesquisas de Energia Eletrica (CEPEL) Approval
I2 CEPEL Intrinsic Safety

Japanese Certifications

Japanese Industrial Standard (JIS) Approvals
I4 JIS Intrinsic Safety
E4 JIS Explosion-Proof

248C License Agreement

★ Applicable to 248C PC Programming Interface Only

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EC Declaration of Conformity for Rosemount 248

ROSEMOUNT

CE

EC Declaration of Conformity

No: RMD 1049 Rev. B

We,

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317-6985
USA

declare under our sole responsibility that the product,

Model 248 Temperature Transmitter

manufactured by,

Rosemount Inc.
12001 Technology Drive
Eden Prairie, MN 55344-3695
USA

and

8200 Market Boulevard
Chanhassen, MN 55317-9687
USA

to which this declaration relates, is in conformity with the provisions of the European Community Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Community notified body certification, as shown in the attached schedule.

(signature)

Vice President of Global Quality
(function name - printed)

Timothy J. Layer
(name - printed)

24-March-2008
(date of issue)

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Schedule

EC Declaration of Conformity RMD 1049 Rev. A.3

EMC Directive (2004/108/EC)

Model 248 Temperature Transmitter
EN 61326: 1997 + A1/A2/A3 – Industrial

ATEX Directive (94/9/EC)

Model 248 Temperature Transmitter

Ex ia IIC: Baseefa03ATEX0030X – Intrinsically Safe Certificate
EN 60079-0: 2006; EN 60079-11: 2007

Ex nL IIC: BAS00ATEX3145 – Type n Certificate
EN 60079-0: 2006; EN 60079-15: 2005

Ex nL IIC: Baseefa03ATEX0032U -- Type n Component Certificate
EN 60079-0: 2006; EN 60079-15: 2005

EEx d IIC: KEMA99ATEX8715 – Flameproof Certificate
EN50018:1994 + prA1…A3, EN50014:1997 and A1, A2 and prA3

ATEX Notified Bodies for EC Type Examination Certificates

KEMA (KEMA) [Notified Body Number: 0344]
Utrechtseweg 310, 6812 AR Arnhem
P.O. Box 5185, 6802 ED Arnhem
The Netherlands
Postbank 6794687

Baseefa (2001) Ltd. [Notified Body Number: 1180]
Health and Safety Laboratory Site
Harpur Hill
Buxton, Derbyshire SK17 9JN
United Kingdom

ATEX Notified Body for Quality Assurance

Baseefa (2001) Ltd. [Notified Body Number: 1180]
Health and Safety Laboratory Site
Harpur Hill
Buxton, Derbyshire SK17 9JN
United Kingdom

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